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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/567,026

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Stephan T. Melnychuk

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EXAMINER

KIKNADZE, IRAKLI

ART UNIT

PAPER NUMBER

2882

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/567,026	Applicant(s) MELNYCHUK ET AL.	
	Examiner IRAKLI KIKNADZE	Art Unit 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 2/2/06.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18-21, 25 and 26 is/are allowed.
- 6) ☒ Claim(s) 1-8, 10, 11 and 14-17 is/are rejected.
- 7) ☒ Claim(s) 9, 12 and 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/6/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 3 and 4 are objected to because of the following informalities:

Claim 3 depends on claim 4 and claim 4 depends on itself.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-8, 10, 11 and 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Meilinas et al. (US Patent 6,215,851 B1).

With respect to claims 1 and 8, Meilunas teaches a proton beam target for generating gamma rays in response to an impinging proton beam, the proton beam target comprising: a thin ¹³C Diamond gamma reaction layer (20) for generating the gamma rays therefrom; and a stopping layer (22) for mitigating transmission of the proton beam therethrough, the stopping layer (22) being formed of a refractory metal which has a relatively high hydrogen solubility for

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dissolving implanted hydrogen atoms therewithin as a result of the impingement of the proton beam and which is chemically reactive with the ^{13}C Diamond gamma reaction layer for chemically bonding therewith, wherein thermal dissipation in the target under proton beam exposure is improved (column 3, line 49 - column 4, 22 and column 5, lines 1-37).

With respect to claim 2, Meilunas teaches that the refractory metal is Tantalum (Ta) (column 4, line 1).

With respect to claim 3, Meilunas teaches that a braze alloy has a liquidus above 800°C (column 5, lines 4-10).

With respect to claims 4, 5, 10 and 11, Meilunas teaches that the thin ^{13}C Diamond gamma reaction layer is deposited on the stopping layer (22) via a plasma assisted CVD process at a temperature below said braze alloy liquidus (column 4, lines 42-54).

With respect to claim 14, Meilunas teaches that the stopping layer comprises a metal foil brazed to a surface of a cooling support fabricated from a low z, high thermal conductivity material. The cooling support dissipates heat energy away from the stopping layer, said stopping layer being attached to the cooling support and is interposed between the ^{13}C Diamond gamma reaction layer and the cooling support (column 4, lines 60-67).

With respect to claims 6 and 7, Meilunas teaches a method of fabricating a proton beam target for generating gamma rays that are reflected therefrom in response to an impinging proton beam, the method comprising the steps of: (a) forming a stopping layer (22) of a refractory metal for mitigating transmission of

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the proton beam therethrough, the stopping layer (22) having a relatively high hydrogen solubility for dissolving implanted hydrogen atoms therewithin as a result of the impingement of the proton beam; and (b) attaching a thin ^{13}C Diamond gamma reaction layer to the stopping layer for generating the gamma rays therefrom in response to the impinging proton beam, the stopping layer (22) being chemically reactive with the ^{13}C Diamond (column 3, line 49 - column 4, 22 and column 5, lines 1-37).

With respect to claim 15, Meilunas teaches that the thin ^{13}C Diamond gamma reaction layer is attached to the stopping layer via plasma assisted CVD process (column 4, lines 42-54).

With respect to claim 16, Meilunas teaches attaching the stopping layer (22) onto a cooling support for dissipating heat energy away from the stopping layer column 4, lines 60-67).

With respect to claim 17, Meilunas teaches that the stopping layer (22) is attached to the cooling support via brazing (column 5, lines 4-15).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 22-24 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sredniawski (US Patent 5,784,430) in view of Meilunas et al. (US Patent 6,215,851 B1).

With respect to claim 22, Sredniawski teaches a contraband detection system comprising: a means for producing a high energy beam of protons (10) at a specific energy with a very narrow energy spread; a proton beam target (12) for generating gamma rays (14) in response to impinging high energy beam of protons, the resultant gamma rays (14) being preferentially absorbed by a targeted contraband material (18); and, a plurality of detector means (22) for detecting absorption of the gamma rays indicating presence of the targeted contraband material, wherein the proton beam target comprises: a thin ^{13}C Diamond gamma reaction layer for generating the gamma rays therefrom (column 4, lines 40-63). Sredniawski is silent about a stopping layer. Meilunas teaches a means for producing a high energy beam of protons at a specific energy with a very narrow energy spread; a proton beam target (18) for generating gamma rays in response to impinging high energy beam of protons, a stopping layer (22), such as Tantalum (Ta), for mitigating transmission of the proton beam therethrough, the stopping layer being formed of a refractory metal which has a relatively high hydrogen solubility for dissolving implanted hydrogen atoms therewithin as a result of the impingement of the proton beam and which is chemically reactive with the ^{13}C Diamond gamma reaction layer for chemically bonding therewith, wherein thermal dissipation in the target under proton beam exposure is improved (column 3, lines 49-65 and column 4, lines 23-58). Ta metal

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has a high solubility limit for hydrogen which allows a high dose of protons to be implanted into the Ta stopping layer before target blistering occurs. The carbide forming nature of Ta contributes good adhesion between the Ta stopping layer and ^{13}C diamond (column 4, lines 43-58). It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the stopping layer teachings of Meilunas in the meted of Sredniawski because it would provide improved proton beam target device for contraband detection system.

With respect to claim 23, Sredniawski teaches that the means for producing a high-energy beam of protons comprises a high current electrostatic accelerator (column 5, lines 40-45).

With respect to claim 24, Sredniawski teaches that the detector means (22) for detecting absorption of said gamma rays comprises Bismuth Germinate (BGO) scintillator detectors (column 6, lines 36-44).

With respect to claim 27, Sredniawski teaches that the detector means for detecting absorption of said gamma rays comprises nitrogenous liquid scintillator detectors (column 5, lines 1-3).

Allowable Subject Matter

5. Claims 9, 12 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. Claims 18-21, 25 and 26 are allowed.

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7. The following is a statement of reasons for the indication of allowable subject matter: With respect to claims 9, 12, 13, 18-21, 25 and 26 prior art does not teach or fairly suggest a proton beam target, method of fabricating a proton beam target and contraband detection system comprising: generating gamma rays in response to an impinging proton beam comprising a stopping layer comprising a SiC substrate as claimed including all of the limitations of the base claim and any intervening claims.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to IRAKLI KIKNADZE whose telephone number is (571)272-2493. The examiner can normally be reached on 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Irakli Kiknadze

/Irakli Kiknadze/

Primary Examiner, Art Unit 2882

/I. K./ September 23, 2008